Parent Guide for Ch 7

Wednesday, February 19, 2025 10:57 AM

Concepts covered

- Logarithm Form to Exponential Form
- Change of base formula
- Product rule and Quotient rule
- Creating Graphs with 2 points and an asymptote
- Use exponential functions to solve word problems

Logarithm

$\log_b(x) = y$

operation, base, input, output

Asks the question: What exponent(output) raised to the base will return my input?

example: $\log_2(8) = y$

$\log_2(8) = 3$ because

$2^3 = 2 \cdot 2 \cdot 2 = 8$

Logarithm(log) Form to Exponential Form

$\log_b x = y$ ➡ logarithmic form

$b^y = x$ ➡ exponential form

example: $\log_8(x+2) = 32$

$8^{32} = (x+2)$

Change of base formula

$$\log_b(x) = \frac{\log(x)}{\log(b)}$$

example: $\log_8(2x) = \frac{\log(2x)}{\log(8)}$

Product rule and Quotient Rule

Product Rule: $\log_3(x) + \log_3(x+2) = \log_3(x(x+2))$

Quotient Rule: $\log_3(x) - \log_3(x+2) = \log_3\left(\frac{x}{x+2}\right)$

Creating Graphs with 2 points and an asymptote

1. Create a table using 2 points.
2. Create two equations in the form $y = ab^x + k$ using the points for (x, y)
3. Solve for both a and b
4. Substitute a, b back into original equation
5. Use equation to solve the remaining problem

Given the information below:
(1, 15) (2, 25) $y = 10$.
Find y when $x = 5$

x	y
1	15
2	25

$15 = ab^1 + 10$ $\quad$ $25 = ab^2 + 10$

$-10 \quad -10$ $\quad$ $-10 \quad -10$

$\frac{5}{b^1} = \frac{ab^1}{b^1}$ $\quad$ $\frac{15}{b^2} = \frac{ab^2}{b^2}$

$\frac{5}{b} = a$ $\quad$ $\frac{15}{b^2} = a$

$a = a \Rightarrow \frac{5}{b} = \frac{15}{b^2}$

$b^2 \cdot \frac{5}{b} = \frac{15}{b^2} \cdot b^2$

$\frac{5b}{5} = \frac{15}{5}$

$b = 3$

$a = \frac{5}{b}$

$a = \frac{5}{3}$

$3^5 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

9 / / 27 / 81 / 243

$y = 5/3(3)^x + 10$

$y = 5/3(3)^5 + 10$

$y = 5/3(243) + 10$

$y = 5(81) + 10$

$y = 405 + 10$

$y = 415$